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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/918,508	08/01/2001	Tatsuo Kakimoto	Q65478	3296

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EXAMINER
WOODWARD, CHERIE MICHELLE

ART UNIT	PAPER NUMBER
1647	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/918,508	KAKIMOTO ET AL.	
	Examiner	Art Unit	
	Cherie M. Woodward	1647	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 June 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,20,21 and 28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,20,21 and 28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *10/5/2007* .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Formal Matters

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4 June 2007 has been entered.

2. The Declarations filed under 37 CFR 1.132 and 1.131, filed 5 July 2007, are acknowledged and have been entered. Claims 1-8, 20, 21, and 28 are pending and under examination.

Response to Arguments

Claim Objections/Rejections Withdrawn

3. The rejection of claims 1-8, 20, 21, and 28 under 35 USC 102(a) as being anticipated by Inoue et al. (Nature 2001; 409:1060-1063) is withdrawn in light of the Declarations under 37 CFR 1.132. maintained for the reasons of record in the Examiner's response of 14 July 2005. The submission of Declarations under 37 CFR 1.132, from all of the co-authors, filed 17 January 2006 is acknowledged. Additionally, the Declaration filed under 37 CFR 1.132 and 1.131 on 5 July 2007 is sufficient to swear behind the date of the Inoue et al. reference.

4. The rejection of claims 1, 2, 6-8, 20, 21, and 28 under 35 U.S.C. 103(a) as being unpatentable over Benfey et al., US Patent 7,026,530 (11 April 2006, priority to 29 November 2000), in view of Iwamura et al. (1983, J Medicinal Chem. 26(6): 838-844), is withdrawn in light of the Declaration filed under 37 CFR 1.131 (5 July 2007), which is sufficient to swear behind the Benfey et al., priority provisional application (60/253,739) with a filing date of 29 November 2000 (see Office Actions of 6 January 2004 and 1 October 2004).

Claim Objections/Rejections Maintained

Claim Rejections - 35 USC § 112, First Paragraph

Scope of Enablement

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it

pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claim 8 remains rejected and claims 1-7 and 28 are also rejected under 35 USC 112, first paragraph, as lacking enablement commensurate in scope with the claims, for the reasons of record and the reasons set forth herein. Claims 1-8 and 28, while being enabling for a method of determining agonist-activity to a cytokine receptor comprising SEQ ID NOs: 2, 4, or 6, does not reasonably provide enablement for a method of determining agonist activity to a generic cytokine receptor.

Applicant argues that one of skill in the art would be able to determine the appropriate structure of the genus of cytokinin receptor variants of claim 8, subsection (i) through a functional assessment. Applicant's argument has been fully considered, but they are not persuasive.

In essence, Applicant argues that any addition, substitution or deletion can be made to a 1176 amino acid protein (using SEQ ID NO: 2 as an example) and as long as the mutant retains function as a cytokinin receptor, and that one of skill in the art would somehow know or be able to discern the structure of the mutant receptor from its functionality. However, Applicant is requested to consider that absent evidence to the contrary, a person of ordinary skill in the art would <u>not</u> be able to predict the structure of a protein or a cytokinin receptor merely from its function.

The specification teaches the structure of three cytokinin receptors SEQ ID NOs: 2, 4, and 6 (SEQ ID NO: 6) (see p. 24 of specification). However, the instant claims are encompass a genus of cytokinin receptors, including variants and chimeras, whose structures are not otherwise taught in the specification. Claim 8, subsections (e), (f), and (g), are drawn to specific regions of SEQ ID NOs: 2 and 4. Claim 8 subsection (d) is drawn to a cytokinin receptor comprising at least one transmembrane region but fewer transmembrane regions than the wild-type cytokinin receptor. Claim 8 subsection (h), is drawn to a chimera-type cytokinin receptor comprising extracellular regions, transmembrane regions and histidine kinase regions, all of which are derived from the same cytokinin receptor, and receiver regions which are not derived from said same cytokinin receptor. Claim 8 subsection (i) is drawn to a cytokinin receptor comprising the amino acid sequence of (a), (b), (c), (e), (f), or (g) with deletion, substitution, or addition of one or a plurality of amino acids... . Independent claim 1 encompasses all of the limitations of the dependent claims.

Claim 8, subsections (d), (h) and (i) are of particular concern because subsection (d) does not teach how many (or few) transmembrane regions may be in the cytokinin receptor and the specification does not provide any guidance in this regard. Subsection (i) encompasses cytokinin receptor extracellular regions, transmembrane regions, and histidine kinase regions all derived from the same cytokinin receptor, and receiver regions which are not derived from the same cytokine receptor. However, the

specification does not provide any guidance as to where these other receiver regions would come from. Are they to come from different cytokinin receptors? If so, which ones? Are they to be taken from other non-cytokinin receptors? If so, which ones? There is insufficient guidance as to the structure of these receiver regions such that the person of ordinary skill in the art would understand their structure.

Subsection (i) encompasses a genus of cytokinin receptors comprising amino acid sequences of (a), (b), (c), (e), (f), or (g) with deletion, substitution, or addition of one or a plurality of amino acids. The specification does not teach which deletions, substitutions, or additions of one or a plurality of amino acids may be made without affecting the function of the cytokinin receptor. While it is known that many amino acid substitutions are generally possible in any given protein, the locations where such amino acid substitutions can be made with a reasonable expectation of success are limited. Certain positions in the sequences are critical to the protein's structure/function relationship, such as various sites or regions directly involved in binding, activity and in providing the correct three-dimensional spatial orientation of binding and active sites. Particular regions may also be critical determinants of antigenicity. These regions can tolerate only relatively conservative substitutions or no substitutions (see Bowie et al, 1990, *Science* 247:1306-1310, especially p.1306, column 2, paragraph 2; Wells, 1990, *Biochemistry* 29:8509-8517). However, Applicant has provided little or no guidance beyond the mere presentation of sequence data to enable one of ordinary skill in the art to determine, without undue experimentation, the positions in the protein which are tolerant to change (e.g. by amino acid substitutions, additions, or deletions), and the nature and extent of changes that can be made in these positions. Although the specification outlines art-recognized procedures for producing and screening for active protein variants, this is not adequate guidance as to the nature of active derivatives that may be constructed, but is merely an invitation to the artisan to use the current invention as a starting point for further experimentation. Even if an active site, binding site, or specific sequence regions were identified in the specification, they may not be sufficient, as the ordinary artisan would immediately recognize that an active site, binding site, or regions comprising a transmembrane domain (particularly a multi-pass transmembrane domain) must assume the proper three-dimensional configuration to be active. Additionally, such three-dimensional conformation is dependent upon surrounding residues. Substitution of non-essential residues can often destroy activity.

It is understood that in claim 8 (i), for example, (which is the only subpart of claim 8 that recites a functional limitation), that embodiments that did not retain cytokine receptor activity (i.e. function) would fall outside the scope of the claimed invention.

Claim 28 is dependent on claim 1 and further limits the "cytokinin receptor gene" of claim 1. It is unclear which "gene" Applicant is referring to, given that independent claim 1 refers to a genus of

cytokinin receptors and cytokinin receptor "genes." "Genes" are comprised of introns and exons and may be alternatively spliced into nucleic acids encoding proteins with different and sometimes completely opposite functions (see Holland et al., Biosystems. 1987; 20(2):181-206, Abstract Only). A review of the sequence listing shows an amino acid sequence correlation with the corresponding nucleotides in SEQ ID NOs: 1, 3, and 5. SEQ ID NOs: 1, 3, and 5 do not appear to contain any introns (non-coding regions). As such, Applicant does not teach or provide any guidance regarding "cytokinin receptor genes." Instead, Applicant appears to provide nucleic acids encoding cytokinin receptors as SEQ ID NOs: 1, 3, and 5.

Additionally, the phrase "a polynucleotide of the nucleotide sequence" in claim 28 is read by the Examiner as a fragment as small as five nucleotides in length (5-mers) up to the full length of the nucleic acid sequence of SEQ ID NOs: 1, 3, and 5. Claim 28 sets forth a definition of "stringent conditions" as 6X SCC at 65C and washing in the presence of 0.1X SCC and 0.5% SDS at 68C for 30 minutes. However, it is well known in the art that the stringency of hybridization is dictated by wash and salt concentration. Using Applicant's definition of wash and salt conditions, there is a probability of 50% mismatch in hybridization under "stringent conditions." Given that the claimed range of hybridization is 3531 nucleotides for SEQ ID NO: 1, 3111 nucleotides for SEQ ID NO: 3, and 3174 nucleotides for SEQ ID NO: 5, and that there is no limitation in the claim as to whether overlapping 5-mers, 10-mers, or 20-mers could be used as the "polynucleotide" that hybridizes to the nucleotide sequence selected from the group consisting of SEQ ID NO: 1, 3, or 5, the claims read on as few as 5 nucleotides (i.e. from a 10-mer primer with 50% mismatch). Applicant has not taught how to make or use 5-mers, such that a given 10-mer would hybridize under the "stringent conditions" defined by Applicant to a nucleic acid sequence selected from the group consisting of SEQ ID NOs: 1, 3, and 5. Determining which 10-mer to use to hybridize, as set forth in claim 28, would be unpredictable and would require undue experimentation.

Due to the large quantity of experimentation necessary to generate the large number of cytokinin receptor variants and screen same for activity, the lack of direction/guidance presented in the specification regarding which structural features are required to provide activity, the absence of working examples directed to same, the complex nature of the invention, the state of the prior art which establishes the unpredictability of the effects of mutation on protein structure and function, and the unpredictability of the claims which fail to recite sufficient structural limitations, undue experimentation would be required of the skilled artisan to make and/or use the claimed invention in its full scope.

Claims 2-7 are rejected as depending from a rejected claim.

Claim Rejections - 35 USC § 112, First Paragraph

Written Description

7. Claims 1-8, 20, 21, and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. This is a written description rejection, rather than an enablement rejection under 35 U.S.C. 112, first paragraph. Applicant is directed to the Guidelines for the Examination of Patent Applications Under the 35 U.S.C. 112, 1 "Written Description" Requirement, Federal Register, Vol. 66, No. 4, pages 1099-1111, Friday January 5, 2001.

The claims are drawn to a method for determining agonist-activity to a cytokinin receptor.

Vas-Cath, Inc. v. Mahurkar, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991), states that Applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention. The invention, for purposes of the written description inquiry, is whatever is now claimed (see page 1117). A review of the language of the claim indicates that these claims are drawn to a genus, i.e., a cytokinin receptor.

To provide adequate written description and evidence of possession of a claimed genus, the specification must provide sufficient distinguishing characteristics of the genus. The factors to be considered include disclosure of complete or partial structure, physical and/or chemical properties, functional characteristics, structure/function correlation, methods of making the claimed product, or any combination thereof.

A description of a genus may be achieved by means of a recitation of a representative number of species falling within the scope of the genus or of a recitation of structural features common to the members of the genus, which features constitute a substantial portion of the genus. *Regents of the University of California v. Eli Lilly & Co.*, 119 F3d 1559, 1569, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997). In *Regents of the University of California v. Eli Lilly* (43 USPQ2d 1398-1412), the court held that a generic statement which defines a genus of nucleic acids by only their functional activity does not provide an adequate written description of the genus. The court indicated that, while applicants are not required to disclose every species encompassed by a genus, the description of the genus is achieved by the recitation of a representative number of species falling within the scope of the claimed genus. At section B(1), the court states, "An adequate written description of a DNA ... requires a precise definition, such as

by structure, formula, chemical name, or physical properties, not a mere wish or plan for obtaining the claimed chemical invention."

The specification describes three cytokinin receptors SEQ ID NOs: 2, 4, and 6 (SEQ ID NO: 6) (see p. 24 of specification). However, the instant claims are encompass a genus of cytokinin receptors, including variants and chimeras, that are not otherwise described in the specification. Claim 8, subsections (e), (f), and (g), are drawn to specific regions of SEQ ID NOs: 2 and 4. Claim 8 subsection (d) is drawn to a cytokinin receptor comprising at least one transmembrane region but fewer transmembrane regions than the wild-type cytokinin receptor. Claim 8 subsection (h), is drawn to a chimera-type cytokinin receptor comprising extracellular regions, transmembrane regions and histidine kinase regions, all of which are derived from the same cytokinin receptor, and receiver regions which are not derived from said same cytokinin receptor. Claim 8 subsection (i) is drawn to a cytokinin receptor comprising the amino acid sequence of (a), (b), (c), (e), (f), or (g) with deletion, substitution, or addition of one or a plurality of amino acids… . Claims 20 and 21 are drawn to generic cytokinin receptors. Independent claim 1 encompasses all of the limitations of the dependent claims.

Claim 8, subsections (d), (h) and (i) are of particular concern because subsection (d) does not describe how many (or few) transmembrane regions may be in the cytokinin receptor. Subsection (i) encompasses cytokinin receptor extracellular regions, transmembrane regions, and histidine kinase regions all derived from the same cytokinin receptor, and receiver regions which are not derived from the same cytokine receptor. However, the specification does not describe where these other receiver regions would come from. There is no description of whether they would come from another cytokinin receptor, such that their structure or function could be determined. Subsection (i) encompasses a genus of cytokinin receptors comprising amino acid sequences of (a), (b), (c), (e), (f), or (g) with deletion, substitution, or addition of one or a plurality of amino acids. The specification does not adequately describe deletions, substitutions, or additions of one or a plurality of amino acids such that a person of ordinary skill in the art would understand which amino acid(s) or regions of amino acids are to be deleted, substituted, or added so that the protein would still retain function as a cytokinin receptor.

There are three species of the claimed genus disclosed that is within the scope of the claimed genus, *i.e.* SEQ ID NOs: 2, 4, and 6. The disclosure of a single disclosed species may provide an adequate written description of a genus when the species disclosed is representative of the genus. However, the present claim encompasses numerous species that are not further described. While "examples explicitly covering the full scope of the claim language" typically will not be required, a sufficient number of representative species must be included to "demonstrate that the patentee possessed

the full scope of the [claimed] invention." Lizardtech v. Earth Resource Mapping, Inc., 424 F.3d 1336, 1345, 76 USPQ2d 1724, 1732 (Fed. Cir. 2005).

In the absence of sufficient recitation of distinguishing characteristics, the specification does not provide adequate written description of the claimed genus, which is a cytokine receptor. One of skill in the art would not recognize from the disclosure that the applicant was in possession of the claimed genus. Possession may not be shown by merely describing how to obtain possession of members of the claimed genus or how to identify their common structural features (see, Univ. of Rochester v. G.D. Searle & Co., 358 F.3d 916, 927, 69 USPQ2d 1886, 1895 (Fed. Cir. 2004); accord Ex Parte Kubin, 2007-0819, BPAI 31 May 2007, opinion at p. 16, paragraph 1).

Applicant is reminded that *Vas-Cath* makes clear that the written description provision of 35 U.S.C. 112 is severable from its enablement provision (see page 1115).

Claims 2-7 are rejected as being dependent on a rejected claim.

Claim Rejections - 35 USC § 112, Second Paragraph

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant has amended claim 28 in such a way that it is now confusing. The amended claim is drawn to "the method of claim 1, wherein the gene hybridizes under stringent conditions to a polynucleotide of the nucleotide sequence selected from" the recited group. There are two indefiniteness problems with claim 28. First, it is unclear which "gene" Applicant is referring to, given that independent claim 1 refers to a genus of cytokinin receptors and cytokinin receptor "genes." "Genes" include introns and exons and may be alternatively spliced into nucleic acids encoding proteins with different and sometimes completely opposite functions (see Holland et al., Biosystems. 1987; 20(2):181-206, Abstract Only). A review of the sequence listing shows an amino acid sequence correlation with the corresponding nucleotides in SEQ ID NOs: 1, 3, and 5. SEQ ID NOs: 1, 3, and 5 do not appear to contain any introns (non-coding regions). As such, the cytokinin receptor "gene" of claim 1 is unclear and confusing. Second, the phrase "a polynucleotide of the nucleotide sequence" in claim 28 is unclear and confusing. The phrase may refer to a fragment as small as five nucleotides in length up to the full length of the recited sequence. The claim, as amended, reads on 5-mers, oligomers, 80-mers, and the full

sequence. The metes and bounds of the phrase "a polynucleotide of the nucleotide sequence" are not clearly defined and are confusing.

Conclusion

NO CLAIMS ARE ALLOWED.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cherie M. Woodward whose telephone number is (571) 272-3329. The examiner can normally be reached on Monday - Friday 9:00am-5:30pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Manjunath N. Rao can be reached on (571) 272-0939. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Date	October 5, 2007
To	Examiner Cherie Woodward
Of	U.S. Patent and Trademark Office
Fax	1-571-273-3329
From	John T. Callahan/Tu A. Phan-Kerr, Ph.D.
Subject	U.S. Patent Application No. 09/918,508
Our Ref	Q65478 Your Ref 559691
Pages	5
(including cover sheet)	

Please call attention to problems with this transmission by return fax or telephone. Thank you.

Dear Examiner Woodward:

Pursuant to our telephone conversation of today, please find attached a listing of the proposed amendments to Claim 8.

Respectfully yours,

Tu A. Phan-Kerr, Ph.D.

1: (previously presented): A method for determining agonist-activity to a cytokinin receptor, comprising:

(1) bringing an examinee substance into contact with a cell transformed with DNA comprising a cytokinin receptor gene, wherein the transformed cell expresses said cytokinin receptor from said DNA;

(2) determining an existence or level of intracellular signal transduction from said cytokinin receptor; and

(3) comparing the existence or level determined in (2) with a second existence or level of intracellular signal transduction from said cytokinin receptor determined in the absence of said examinee substance.

2: (previously presented): The method according to claim 1, wherein growth of said transformed cell is controlled by intracellular signal transduction from said cytokinin receptor, and wherein said existence or level and said second existence or level of intracellular signal transduction from said cytokinin receptor are determined by measuring growth of said transformed cell.

3: (previously presented): The method according to claim 1, wherein said transformed cell is generated from a host cell, wherein said host cell is improved so as to have a lower histidine kinase activity lower than before the improvement.

4: (previously presented): The method according to claim 1, wherein said transformed cell is generated from a host cell having a lowered histidine kinase activity, wherein said histidine kinase activity was lowered by a defect in one or more histidine kinase genes.

5: (previously presented) The method according to claim 1, wherein said transformed cell is generated from a host cell having no cytokinin receptor.

6: (previously presented) The method according to claim 1, wherein said transformed cell is yeast.

7: (previously presented) The method according to claim 1, wherein said transformed cell is budding yeast.

8: (currently amended) The method according to claim 1, wherein said cytokinin receptor is selected from the group consisting of:

(a) a cytokinin receptor comprising the amino acid sequence of SEQ ID No: 6;

(b) a cytokinin receptor comprising the amino acid sequence of SEQ ID No: 2;

(c) a cytokinin receptor comprising the amino acid sequence of SEQ ID No: 4;

~~(d) a cytokinin receptor comprising at least one transmembrane region but fewer transmembrane regions than wild-type cytokinin receptor;~~

(ed) a cytokinin receptor comprising the amino acid sequence of amino acids 196 to 1176 of SEQ ID No: 2;

(~~f~~e) a cytokinin receptor comprising the amino acid sequence of amino acids 50 to 1176 of SEQ ID No: 2;

(~~g~~f) a cytokinin receptor comprising the amino acid sequence of amino acids 32 to 1036 of SEQ ID No: 4;

(~~h~~g) a chimera-type cytokinin receptor comprising extracellular regions, transmembrane regions and histidine kinase regions, all of which are derived from the same cytokinin receptor consisting of the group selected from CRE 1, AHK2 and AHK3, and receiver regions which are not derived from said same cytokinin receptor; and

(i~~h~~) a cytokinin receptor comprising the amino acid sequence of (a), (b), (c), (e~~d~~), (f~~e~~), or (g~~f~~) with deletion, substitution, or addition of one or a plurality of amino acids, wherein the amino acid sequence has 80% or higher identity to the amino acid sequence before the deletion, substitution or addition of amino acids, wherein said cytokinin receptor has cytokinin receptor activity and is encoded by a polynucleotide that hybridizes under stringent conditions to a polynucleotide of the nucleotide sequence selected from the group consisting of SEQ ID NOS:1, 3, and 5, and wherein said stringent conditions comprise hybridization at 6 X SSC at 65 °C and washing in the presence of 0.1 X SSC and 0.5% SDS at 68 °C for 30 minutes.

9-19: (canceled)

20: (previously presented): A method for determining agonist-activity to a cytokinin receptor, comprising:

(1) bringing an examinee substance into contact with a cell transformed with DNA comprising a cytokinin receptor gene, and wherein the transformed cell expresses said cytokinin receptor from said DNA;

(2) determining an existence or level of intracellular signal transduction from said cytokinin receptor; and

(3) comparing the existence or level determined in (2) with a second existence or level of intracellular signal transduction from said cytokinin receptor determined in the absence of said examinee substance but in presence of another substance.

21: (previously presented) The method according to claim 20, wherein another substance is a substance having no agonist-activity to said cytokinin receptor.

22-27: (canceled)

28. (previously presented): The method according to claim 1, wherein said gene hybridizes under stringent conditions to a polynucleotide of the nucleotide sequence selected from the group consisting of SEQ ID Nos: 1, 3, and 5, wherein said stringent conditions comprise hybridization at 6 X SCC at 65 °C and washing in the presence of 0.1 X SSC and 0.5% SDS at 68°C for 30 minutes, and wherein said gene encodes a protein having cytokinin receptor activity.

29. (canceled)